

## NEW CYNIPID WASPS FROM THE SOUTHWESTERN UNITED STATES (HYMENOPTERA: CYNIPIDAE)

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**Abstract.**—Seven new cynipid species are described from Arizona and western Texas: *Ceropteres snellingi*, *Xanthoteras pungens*, *X. tuckeri*, *Antron daileyi*, *A. franklinensis*, *A. madera*, and *Andricus flocculentus*. Appropriate morphological features of the species are illustrated. Included is a key to the described United States species of *Antron*.

**Key Words.**—Insecta, Cynipidae, inquiline, unisexual female, monothalamous gall, *Quercus arizonica*, *Q. pungens*, *Q. toumeyii*, southwestern U.S. (Arizona and western Texas).

The phytophagous cynipid fauna of the southwestern United States (Arizona, New Mexico, and western Texas) and adjacent Mexico needs additional study. Weld (1960) listed 130 species of Cynipidae from this area but in addition illustrated 117 galls from which no gall wasps were ever reared, thus there is still collecting and rearing to be done. No life cycle, i.e., no linking of alternating unisexual and bisexual generations of any species, has ever been achieved through experimental rearings in the region. Knowledge of such alternating generations, which are frequently morphologically very dissimilar, would prove useful in understanding the taxonomic status of these wasps at both specific and generic levels.

Of particular interest are the cynipids that induce galls on the shrub oak, *Quercus pungens* Liebmann, which until recently (Lyon 1993) was not known to be a cynipid host. Since it is a white oak (Subgenus *Lepidobalanus*) it was found to be "galled" by several described cynipids that form galls on other white oaks in this area. The following are New Host Records for species that form galls on *Q. pungens*: *Neuroterus howertoni* Bassett, *Disholcaspis rubens* Gillette, *Atrusca brevipennata* (Gillette), *Callirhytis juvenca* Weld, *C. frequens* (Gillette). The two new *Xanthoteras* species described below show some most unusual morphological variations, particularly in the reduction of the wings and their peculiar venation. Other undescribed galls were collected during this study, but I was unable to rear adult wasps.

### ANDRICUS FLOCCULENTUS LYON, NEW SPECIES (Figs. 18, 19)

Holotype female; TEXAS. EL PASO CO.: Franklin Mountains, El Paso, 15 Feb 1969, R. J. Lyon, from galls on *Quercus pungens* Liebmann; deposited: U.S. National Museum of Natural History, Washington, D.C. Paratypes: same data as holotype, except collected 16 Feb–16 Mar 1962, 15 Feb 1969; deposited: U.S. National Museum of Natural History, Washington, D.C. (3), California Academy of Sciences, San Francisco, CA (3), Natural History Museum of Los Angeles County, Los Angeles, CA (3), R. J. Lyon collection (5).

**Description.**—Female. Black, except legs, antennal segments and ventral spine of metasoma light-brown. Length: 1.5–1.75 mm ( $\bar{x}$  = 1.6 mm,  $n$  = 17). Head transverse in dorsal view, as broad as mesosoma, occiput concave; gena not broadened or visible behind eye in frontal view; interocular

area  $2\times$  as broad as high; malar space striate,  $0.20\times$  eye length (EL); ocellar area, frons and other parts of head, coriaceous. Antenna 13-segmented, segments 3 and 4 equal in length, terminal segment  $2\times$  as long as 12. Scutum coriaceous, marginate, subcircular and only slightly longer than broad, bare; notauli incomplete. Scutellum round behind, sparsely pubescent; surface entirely rugose or rugose only posteriorly; foveal pits replaced by a transverse groove with smooth, shining bottom. Propodeal carinae arcuate, enclosure smooth and shining. Mesopleuron aciculate and protuberant. Legs pubescent; tarsal claws toothed. Forewing hyaline and pubescent, margins ciliate; veins brown; areolet well-developed, reaching one-fifth distance to Basal Vein ( $Rs+M$ );  $M_1$  not reaching Basal Vein;  $Rs_1$  angled;  $Rs_2$  arcuate; Radial Cell  $3\times$  as long as broad. Metasoma higher than long, three terga visible along dorsal curvature; terga smooth and shining; tergite 2 with basal pubescent patch; ovipositor sheaths protruding, tip of ovipositor curved. Ventral spine sparsely pubescent, length  $4\times$  width.

*Diagnosis.*—Distinguished from other members of the genus by its striate malar area, completely aciculate mesopleuron, and nearly circular mesoscutum.

*Gall.*—(Figs. 18, 19).—Clustered, individual cells forming a woolly mass on the underside of the leaf midrib. Similar galls occur on other white oaks in the area, but no adults of *A. flocculentus* were reared from them.

*Host.*—*Quercus pungens*

*Material Examined.*—See types.

#### *CEROPTERES SNELLINGI* LYON, NEW SPECIES

Holotype female; TEXAS. *El PASO CO.*: Franklin Mountains, El Paso, 15 Feb 1969, R. J. Lyon, from galls of *Andricus flocculentus* Lyon on *Quercus pungens*; deposited: U.S. National Museum of Natural History, Washington, D.C. Paratypes: same data as holotype; deposited: U.S. National Museum of Natural History, Washington, D.C. (3), California Academy of Sciences, San Francisco (3), Natural History Museum of Los Angeles County, Los Angeles (3), R. J. Lyon collection (8).

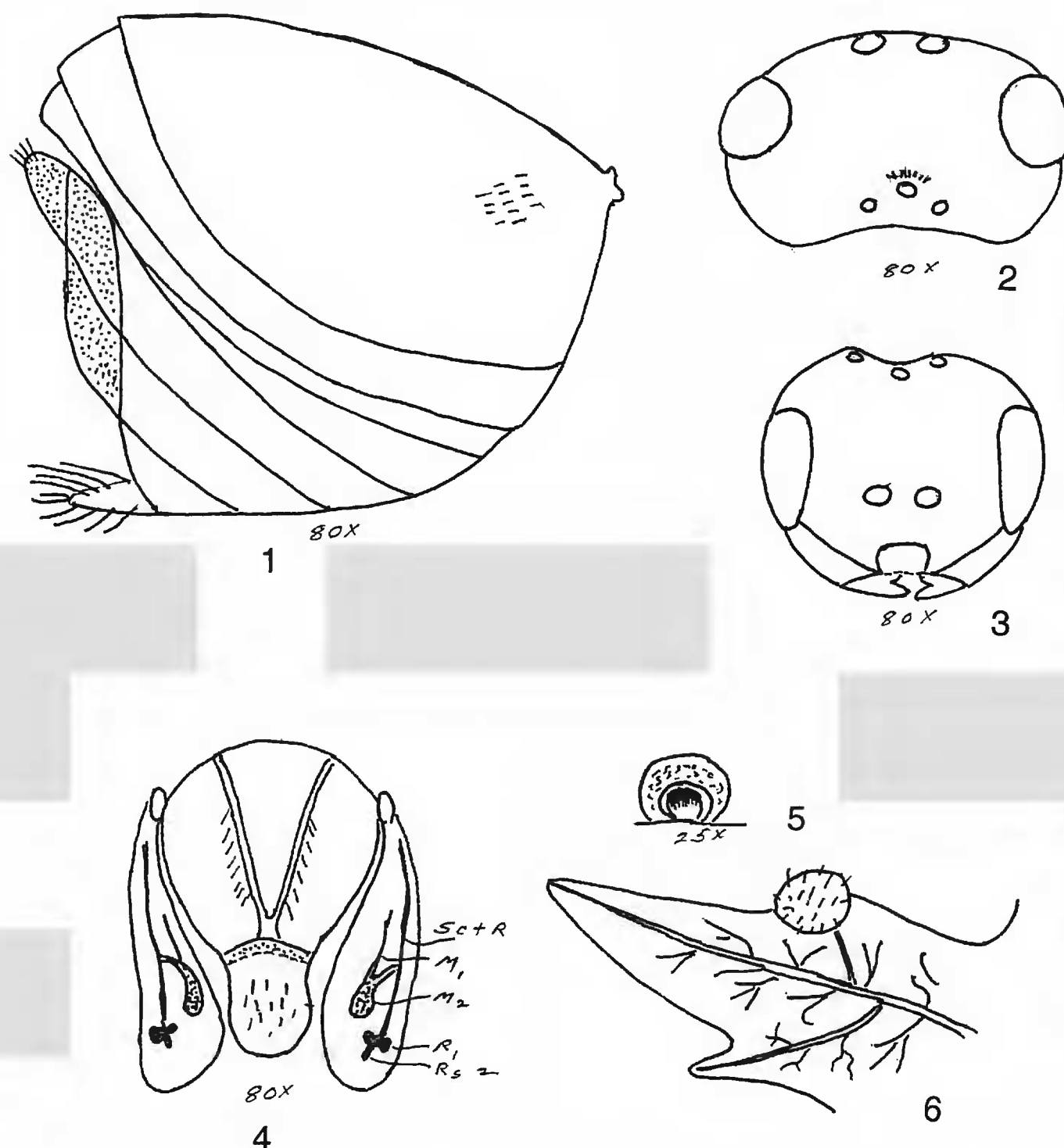
*Description.*—Female. Head and body red-brown; legs, antennae and ventral spine amber, with darker infuscations. Length 1.25–1.75 mm ( $\bar{x} = 1.47$  mm;  $n = 15$ ). Head transverse in dorsal view, microcoriaceous; occiput concave; vertex flattened, median ocellar area depressed; interocular area wider than high; malar space with prominent, divergent striae; gena not broadened behind eye; a parallel ridge on each side extends between antennal socket and clypeus. Antenna 12-segmented, segment 3 equal to 4 in length, segment 12 longer than 11. Scutum slightly broader than long, somewhat truncate anteriorly, microcoriaceous and with numerous white bristles; notauli incomplete, extending one-half the distance to pronotum; lateral lines faint and median line represented by a short notch. Mesopleuron smooth, shining, not striate. Scutellum rounded behind, rugose, with long white bristles; foveal pits small, oval, separated, almost hidden by coarse sculpture in some specimens. Tarsal claws edentate. Forewing hyaline, pubescent, margins ciliate; veins pale; areolet well-developed, extending one-fourth distance to Basal Vein;  $M_1$  not reaching Basal Vein; radial cell closed, about  $2\times$  as long as broad;  $Rs_1$  arcuate;  $Rs_2$  almost straight. Metasoma slightly higher than long, petiole ridged as in *Synergus*; tergite 2 bristly, saddle-shaped,  $0.4\times$  as long as 3 and separated from it by a connate suture; ovipositor sheaths long, projecting almost vertically above terga. Ventral spine short.

*Male.*—Slightly smaller than female, length 1.0–1.5 mm; color similar. Antenna 14-segmented; notauli extending three-fourths distance to pronotum; tergite 2 sparsely pubescent.

*Diagnosis.*—This species can be separated from other members of the genus by the following combination of characters: small, separated foveal pits; prominent, long, vertically-projecting ovipositor sheaths; incomplete notauli; female antenna 12-segmented.

*Host.*—This species is an inquiline in the galls of *Andricus flocculentus* on *Quercus pungens*.

*Etymology.*—This species is named for Roy R. Snelling, Natural History Mu-



Figures 1-6. *Xanthoteras tuckeri*, Lyon, NEW SPECIES. Figure 1. Metasoma, lateral view showing shape of terga. Figure 2. Head, dorsal view (massive: more than 0.5X as long as broad). Figure 3. Head, frontal view, showing malar furrows. Figure 4. Mesosoma, dorsal view, showing configuration and unusual wing venation. Figure 5. Monothalamous gall showing position of larval cell. Figure 6. Leaf of *Q. pungens* showing gall on margin of upper surface.

seum of Los Angeles County, who has been of great assistance and encouragement in the writing of this paper.

*Material Examined.*—See types.

*XANTHOTERAS TUCKERI* LYON, NEW SPECIES  
(Figs. 1-6)

Holotype female; TEXAS. *EL PASO CO.*: Franklin Mountains, El Paso, 15 Feb 1969, R. J. Lyon, from galls on *Quercus pungens*; deposited: U.S. National Museum of Natural History, Washington, D.C. Paratypes: same data as holotype, deposited: U.S. National Museum of Natural History, Washington, D.C. (2), Cal-

ifornia Academy of Sciences, San Francisco (2), Natural History Museum of Los Angeles County, Los Angeles (2), R. J. Lyon collection (9).

*Description*.—Unisexual female. Uniformly red-brown, except metasomal segments dark brown apically. Length 1.2–1.9 mm ( $\bar{x}$  = 1.4 mm;  $n$  = 16). Head more than 0.5× as long as broad, massive in dorsal view, broader than mesosoma; surface granulose; gena not broadened behind eye in frontal view; ocellar area depressed; malar space almost as long as eye, malar furrow present; interocular area nearly 2× as broad as high. Antenna 14-segmented, moniliform, segment 3 2× as long as 4, segment 14 longer than 13. Scutum as wide as long, smooth and shining; notauli complete in some specimens, replaced by a row of pits in others. Mesopleuron smooth and shining, slightly bulging in center. Forewing greatly reduced, venation modified from that of typical, phytophagous cynipids (Fig. 4): Sc+R well-developed, heavy;  $M_1$  heavy, extending toward base of wing;  $R_1$  claviform;  $Rs_2$  very short;  $M_2$  short, heavy, terminating in a rounded club; other veins, including areolet, absent. Legs pubescent; tarsal claws dentate. Metasoma longer than high, all terga visible along dorsal curvature; terga smooth, except punctate last segment; ovipositor sheaths punctate. Ventral spine bristly, 2.5× as long as broad in lateral view.

*Diagnosis*.—Separable from other species in this genus by the massive head and the reduced wing with unique venation described above (Fig. 4).

*Gall*.—(Figs. 5, 6).—Monothalamous, tiny (2.5 mm diameter), spherical, on upper leaf surface; larval cell occupying lower portion of gall; appears in late summer, maturing in late December through January and February.

*Host*.—*Quercus pungens*.

*Etymology*.—Named for Professor John Tucker, University of California, Davis, who located the stands of *Q. pungens* used in this study.

*Material Examined*.—See types.

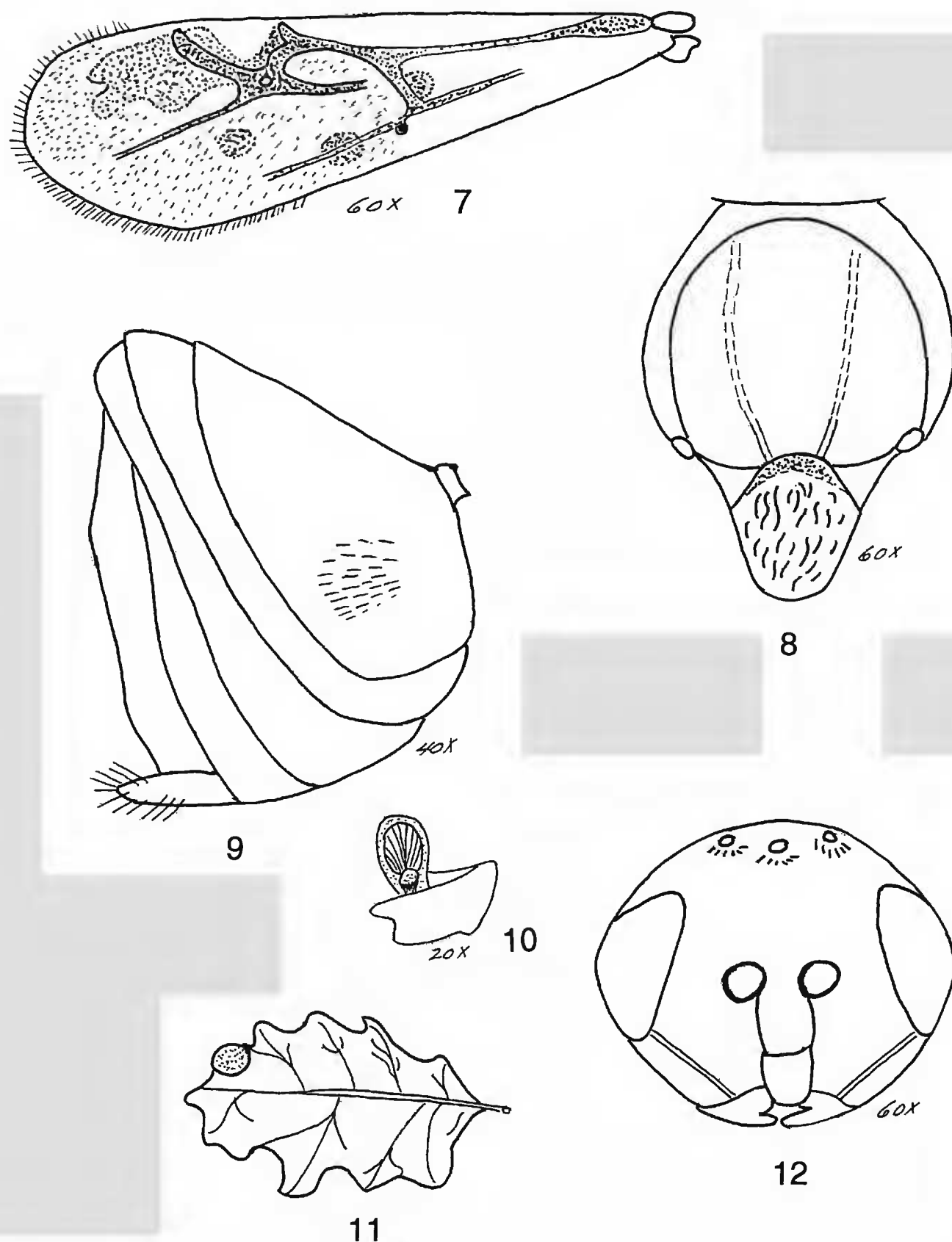
#### *XANTHOTERAS PUNGENS* LYON, NEW SPECIES

(Figs. 7–12)

Holotype female; TEXAS. *El PASO CO.*: Franklin Mountains, El Paso, 13 Jan 1969, R. J. Lyon, from galls on *Quercus pungens* deposited: U.S. National Museum of Natural History, Washington, D.C. Paratypes: same data as holotype except collected 15–30 Dec 1972; deposited: U.S. National Museum of Natural History, Washington, D.C. (2), California Academy of Sciences, San Francisco (2), Natural History Museum of Los Angeles County, Los Angeles (2), R. J. Lyon collection (9).

*Description*.—Unisexual female. Uniformly red-brown, posterior metasomal terga darker. Length 2.3–2.7 mm ( $\bar{x}$  = 2.5 mm;  $n$  = 20). Head transverse, broader than mesosoma; surface coriaceous; mandibles with prominent teeth; gena not broadened behind eyes in frontal view; malar space less than .75× eye length, furrow present; interocular area 2× as wide as high; ocelli amber, each ocellus in surrounding depression. Antenna stoutly moniliform, 13-segmented, segment 3 longer than 4, segment 13 nearly 2× as long as 12. Pronotal side smooth, lightly striate along borders. Scutum smooth and polished; notauli visible only posteriorly, but extending forward as a row of punctures and a few bristles. Scutellum longer than broad, margined and longitudinally ridged; foveae represented by an arcuate groove. Propodeum with arcuate carinae, enclosure rugose. Mesopleuron smooth and polished, with striate area below wing. Legs pubescent, claws dentate. Forewing (Fig. 7) short, not quite reaching tip of mesosoma, pubescent, short-ciliate along posterior margin. Veins thick and heavy; areolet absent; Radial Cell short;  $Rs_2$  swollen and curved upward; Cubital Cell 3 with dark, irregular patch extending into radial cell; slight darkening in Discoïdal Cell and along  $M_1$ ,  $Rs+M$  and Median Veins. Metasomal terga smooth and polished, tergum 2 with pubescent patch. Ventral spine slightly more than 2× as long as thick in lateral view, tapering to blunt point.

*Diagnosis*.—This species can be separated from the other species in the genus



Figures 7–12. *Xanthoteras pungens*, Lyon, NEW SPECIES. Figure 7. Forewing. Figure 8. Mesosomal configuration, dorsal view. Figure 9. Metasoma, lateral view. Figure 10. Monothalamous gall, sagittal section, showing structure and position of larval cell. Figure 11. Leaf of *Q. pungens*, showing gall on margin of upper leaf surface. Figure 12. Head, frontal view.

by its shortened forewing with distinctive venation, stout, moniliform antenna and by the posterior incomplete notauli, represented by a row of punctures in the anterior region of scutum.

*Gall.*—Monothalamous and dome-shaped (Figs. 10, 11), projecting 3–5 mm from upper leaf surface; larval cells basal, with radiating filaments to wall. Adults mature and emerge from late December to mid-January.

*Host.*—*Quercus pungens*.



*Etymology*.—This species is named for its host.

*Material Examined*.—See types.

*ANTRON MADERA* LYON, NEW SPECIES

(Figs. 13, 14)

Holotype female; ARIZONA. *PIMA CO.*: Santa Rita Mountains, Tucson, 1 Apr 1972, R. J. Lyon, from galls on *Quercus arizonica* Sargent; deposited: U.S. National Museum of Natural History, Washington, D.C. Paratypes: same data as holotype except collected 10–15 Apr 1972 on *Q. toumeyi* Sargent; deposited: U.S. National Museum of Natural History, Washington, D.C. (1), R. J. Lyon collection (3).

*Description*.—Unisexual female. Light yellow-brown; eyes, ocelli, tips of tarsi, terminal antennal segments and ovipositor sheaths darker brown. Length 2.5–2.7 mm ( $\bar{x}$  = 2.65 mm;  $n$  = 5). Head transverse, as broad as mesosoma; gena slightly broadened behind eyes; interocular space wider than high; malar space less than one-third as long as eye, groove absent; antenna 13-segmented, segment 3 longer than 4 and succeeding segments, segment 13 longer than 12. Scutum longer than broad, surface coriaceous, pubescent laterally; notauli complete, curving laterally. Scutellum elongate, longer than broad, rugose along margins, rounded behind; pits represented by a shallow, arcuate groove. Mesopleuron slightly bulging, smooth, shining, with white setae along anterior and ventral edges. Propodeal carinae arcuate, enclosure smooth. Legs pubescent; claw dentate. Forewing pubescent; veins brown; margin ciliate;  $M_1$  reaching Basal Vein; areolet small; Radial Cell 3.5× as long as broad; faint, darkened, translucent patches in Radial, Cubital, and Discoidal Cells. Metasoma as long as high, smooth and shining; three terga visible along dorsal curvature; tergum 2 with small pubescent patch. Ventral spine stout, bristly, 3× as long as broad in lateral view.

*Diagnosis*.—Separable from other species in this genus by the following combination of characteristics: tergite 2 not foliiform, antenna 13 segmented, foveal pits replaced by a shallow, arcuate groove, and faint, translucent, dark patches in the Radial, Cubital and Discoidal Cells.

*Gall*.—Monothalamous, spherical (Figs. 13, 14), small (3 mm diameter); attached to midrib on undersurface of leaf, flattened at point of attachment. Mature galls are slightly wrinkled and have scattered red and white microstellate hairs. The larval cell is centrally located and surrounded by thick nutritive layer that becomes spongy in older galls.

*Hosts*.—*Quercus arizonica* and *Q. toumeyi*.

*Etymology*.—This species is named for its site of occurrence; Madera Canyon, Santa Rita Mts., Arizona.

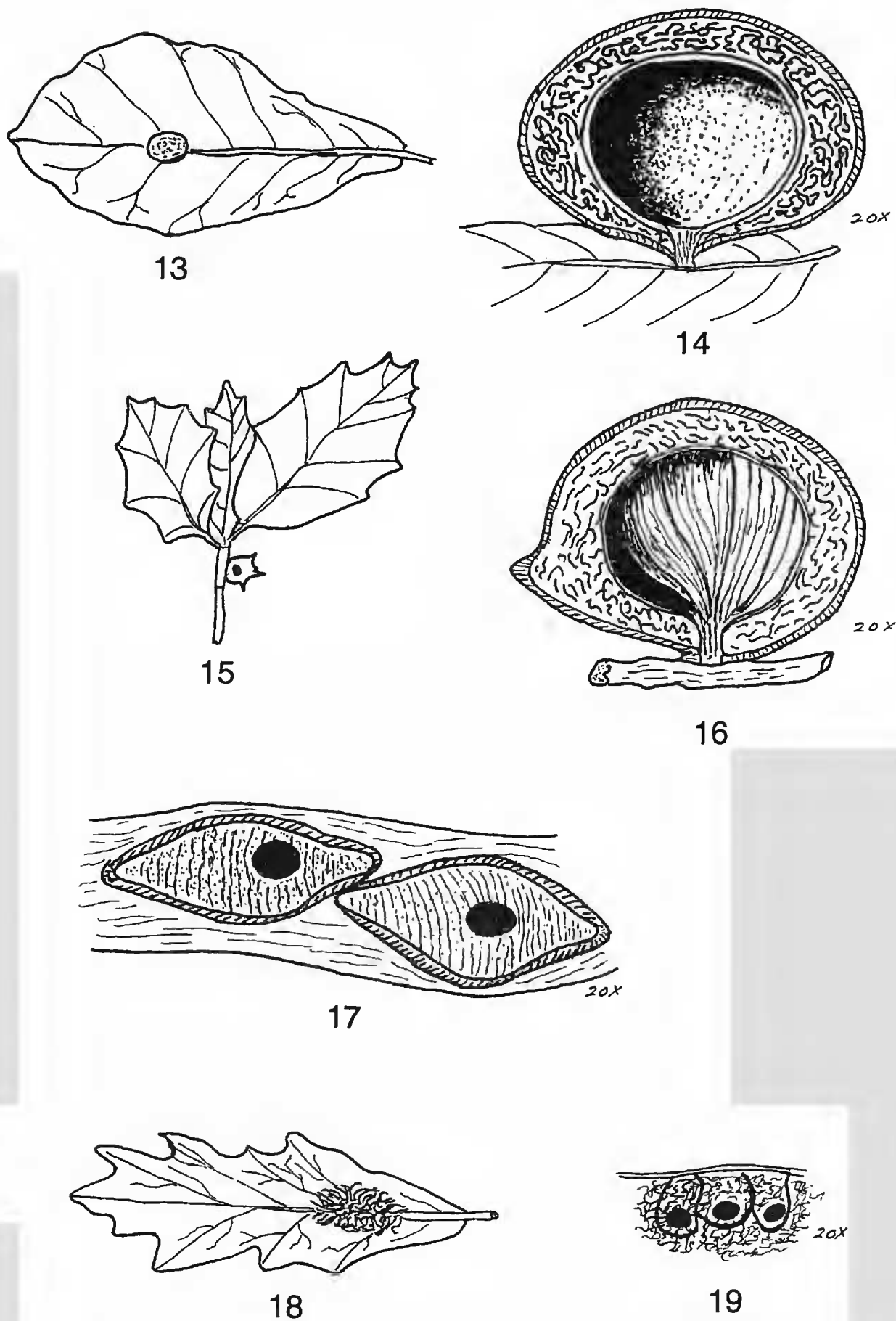
*Material Examined*.—See types.

*ANTRON DAILEYI* LYON, NEW SPECIES

(Fig. 17)

Holotype female; TEXAS. *EL PASO CO.*: Franklin Mountains, El Paso, 23 Mar 1970, R. J. Lyon, from galls on *Quercus pungens* deposited: U.S. National Museum of Natural History, Washington, D.C. Paratypes: same data as holotype except collected 23–26 Mar 1970; deposited: U.S. National Museum of Natural History, Washington, D.C. (8), California Academy of Sciences, San Francisco (8), Bohart Museum of Entomology, University of California, Davis (6), Natural History Museum of Los Angeles County, Los Angeles (6), R. J. Lyon collection (30).

*Description*.—Unisexual female. Black, with red tinges; basal five antennal segments, tibiae and



Figures 13–19. Galls. Figures 13–14. *Antron madera*, Lyon, NEW SPECIES. Figure 13. Gall attached to upper surface midrib. Figure 14. sagittal section of gall showing detail of larval cell and thickened cell wall. Figures 15–16. *Antron franklinensis*, Lyon, NEW SPECIES. Figure 15. Position of twig gall on *Q. turbinella*. Figure 16. Sagittal section of gall showing detail of larval cell and thickened cell wall. Figure 17. *Antron daileyi*, Lyon, NEW SPECIES. Galls on twigs of *Q. pungens*. Figures 18–19. *Andricus flocculentus*, Lyon, NEW SPECIES. Figure 18. Cluster of woolly galls on midrib of *Q. pungens*. Figure 19. Sagittal sections of galls showing detail of individual galls.

tarsi light brown. Length 1.7–2.6 mm ( $\bar{x}$  = 2.2 mm;  $n$  = 54). Head transverse, as broad as mesosoma; slightly broadened behind eyes; occiput concave; median ridge extending from median ocellus nearly to level of antennal sockets; interocular space almost 3× as broad as high; malar space one-third eye length, striate; ocellar area and frons rugose, frons with white bristles. Antenna 14-segmented, segment 3 longer than 4, segment 14 2× as long as 13. Scutum slightly broader than long, prominently high-arched in side view, coriaceous, shining and with white bristles near posterior and lateral margins; notauli complete; anterior lines appear as a pair of smooth, shining, parallel streaks extending posteriorly from the anterior margin of the scutum, some specimens with very short median line. Scutellum marginate, coarsely rugose and with white bristles; foveal pits deep, separated, with smooth, shining bottoms. Propodeum slightly rugose, but without distinct carinae. Mesopleuron bulging, partly aciculate. Legs pubescent; tarsal claws prominently dentate. Forewing hyaline, veins dark brown, pubescent, and with ciliate margins; areolet well-developed, extending one-fourth distance to Rs+M;  $M_1$  not reaching Basal Vein,  $Rs_1$  angled;  $Rs_2$  not enlarged at wing margin; Rs+M with distinct “knobs” in some specimens; Radial Cell 3× as long as broad. Metasoma longer than high, only three terga visible along dorsal curvature; tergum 2 smooth and shining, remaining terga punctate; ovipositor sheaths protruding, punctate and bristly. Ventral spine bristly, 3× as long as broad in lateral view, triangular in ventral view (Fig. 28).

*Diagnosis.*—This species can be separated from the other species in the genus by the following combination of characteristics: gena, in frontal view, broadened behind eyes; tergite 2 not foliiform; antenna with 14 segments; scutum high-arched in side view.

*Gall.*—(Fig. 17) - Monothalamous, thin-walled blisters that burst from cracks in the bark of twigs; galls are smooth, tan, 5–7 mm long. Adult females emerged 23–26 Mar and oviposited in unopened, dormant buds.

*Host.*—*Quercus pungens*. Galls of this type were also seen on *Q. arizonica*, *Q. grisea* Liebmann and *Q. oblongifolia* Torrey but no wasps were reared from them.

*Etymology.*—This species is named for Charles Dailey, Sierra College, Rocklin, California, who has made many contributions to our knowledge of the Cynipidae.

*Material Examined.*—See types.

#### ANTRON FRANKLINENSIS LYON, NEW SPECIES

(Figs. 15, 16)

Holotype female; TEXAS. *EL PASO CO.*: Franklin Mountains, El Paso, 29 Dec 1962, R. J. Lyon, from galls on *Quercus turbinella* Greene; deposited: U.S. National Museum of Natural History, Washington, D.C. Paratypes: same data as holotype; deposited: U.S. National Museum of Natural History, Washington, D.C. (1), R. J. Lyon collection (3).

*Description.*—Unisexual female. Uniformly light brown; terminal antennal segments and tarsi darker brown. Length 2.9–3.1 mm ( $\bar{x}$  = 3.0 mm;  $n$  = 5). Head transverse, as broad as mesosoma; gena broadened behind eyes; occiput strongly concave; interocular space 2× as wide as high; malar space shorter than eye length and without groove. Antenna 13-segmented, segment 3 longer than 4, segment 13 equal to 12 in length. Scutum coriaceous, with white bristles, strongly convex in profile, slightly broader than long; notauli incomplete, lateral area smooth and shining; anterior lines barely visible as smooth streaks. Scutellum with microscopic, longitudinal ridges partially obscured by long, white bristles; foveal pits replaced by an arcuate groove. Mesopleuron smooth and polished, slightly protuberant beneath wing base. Propodeal carinae short, arcuate. Legs pubescent; tarsal claws with long tooth. Forewing hyaline and pubescent, margins ciliate; veins dark chocolate-brown; areolet small, extending one-fifth of distance to Basal Vein;  $M_1$  reaching Rs+M; Rs+M with distinct spur at junction with M+Cu;  $Rs_2$  arcuate, terminating in a flattened club; Radial Cell 2× as long as broad. Metasoma longer than high, three terga visible along dorsal curvature, tergite 2 foliiform; tergites impunctate. Ventral spine bristly, broad and tapering to point, 3× as long as wide in profile.



*Diagnosis.*—This species can be separated from the other species in the genus by a combination of the following characteristics: tergite 2 foliiform; notauli incomplete; distinctive wing venation;  $Rs_2$  arcuate, terminating in a flattened club; gena distinctly broadened behind eyes.

*Gall.*—(Figs. 15, 16).—A small monothalamous gall, 7 mm long, thorn-shaped; appears on twigs in late fall; mature adults collected in December.

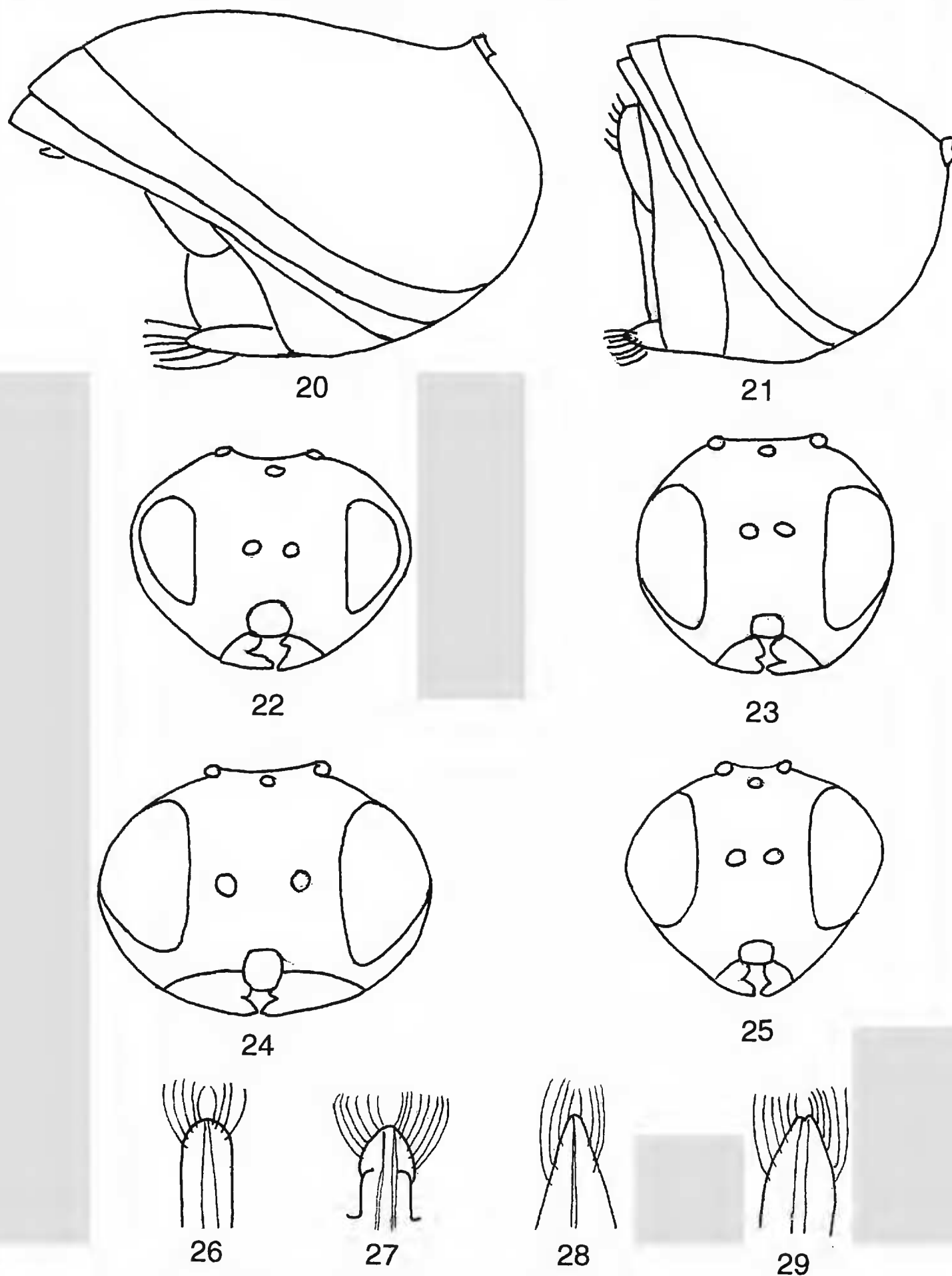
*Host.*—*Quercus turbinella*.

*Etymology.*—This species is named for the Franklin Mountains where the host species of oak occurs.

*Material Examined.*—See types.

KEY TO THE DESCRIBED SPECIES OF *ANTRON* KINSEY IN THE UNITED STATES

- 1. Tergites 2–7 abundantly pubescent; tergite 2 foliiform (Fig. 20) . . . . 2
- 1'. Tergite 2 with pubescent patch only, other terga bare; tergite 2 foliiform or not (Fig. 21) . . . . . 3
- 2(1). Head, in frontal view, with gena visible and broadened behind eyes (Fig. 22); Cubital Cell clear or with very faint darkened patches in some specimens; apex of ventral spine rounded in ventral view (Fig. 26). Light red-brown species from rounded, lead-colored galls on *Quercus arizonica*, *Q. toumeyi*, and *Q. oblongifolia* in Arizona . . . . . *A. plumbeum* (Weld)
- 2'. Head, in frontal view, with gena not visible or broadened behind eyes (Fig. 23); Cubital Cell with two distinct dark, translucent patches sometimes fused; apex of ventral spine acute in ventral view (Fig. 28). Dark brown or red-brown species from red, woolly clusters on midribs beneath leaves of *Q. arizonica*, *Q. toumeyi*, and *Q. oblongifolia* in Arizona . . . . . *A. quercusnubila* (Bassett)
- 3(1'). Notauli incomplete; tergite 2 foliiform; forewing clear, with small, dark patch around  $Rs_1$ . Light brown species from small, thorn-shaped twig galls on *Q. turbinella* in western Texas (Fig. 15). . . . . *A. franklinensis* Lyon
- 3'. Notauli complete; tergite 2 foliiform or not . . . . . 4
- 4(3'). Gena in frontal view visible and broadened behind eyes . . . . . 5
- 4'. Gena in frontal view not visible or broadened behind eyes . . . . . 10
- 5(4). Tergite 2 not foliiform . . . . . 6
- 5'. Tergite 2 foliiform . . . . . 7
- 6(5). Antenna 14-segmented; all terga beyond second punctate; scutellum rugose, foveal pits deep, separated, with shining bottoms; scutellar tip broadly rounded; wing hyaline, clear,  $M_1$  not reaching Basal Vein; ventral spine bristly with triangular tip (Fig. 28); dark species from thin-walled blisters that burst from cracks on the twigs of *Q. pungens* in Arizona, New Mexico and western Texas. . . . . *A. daileyi* Lyon
- 6'. Antenna 13-segmented; terga smooth, impunctate; scutellum rugose only on the side; foveal pits replaced by a shallow, arcuate groove; scutellar tip sloping to a narrow but rounded point; wing with faint darkened patches in the Radial, Cubital and Discoidal Cells;  $M_1$  reaching Basal Vein; ventral spine bristly with rounded, notched



Figures 20–29. Key characters in *Antron* taxonomy. Figure 20. Foliiform metasomal tergum 2. Figure 21. Non-foliiform metasomal tergum 2. Figure 22. Frontal view of head to show gena broadened behind eyes. Figure 23. Frontal view of head to show gena not broadened. Figure 24. Oval-shaped head in frontal view. Figure 25. Deltoid-shaped head in frontal view. Figure 26. Ventral spine of metasoma, ventral view, showing rounded apex. Figure 27. Ventral spine, curving to blunt point. Figure 28. Ventral spine with triangular tip. Figure 29. Ventral spine, with blunt, notched tip.

- tip (Fig. 29). Light yellow-brown species from small, spherical, thick-walled galls on midrib of the undersurfaces of leaves of *Q. arizonica*, *Q. oblongifolia* and *Q. toumeyi* in Arizona (Fig. 13)  
..... *A. madera* Lyon
- 7(5'). Antenna 13-segmented ..... 8
- 7'. Antenna 14-segmented ..... 9
- 8(7). Head oval in frontal view (height about 0.66 × width, (Fig. 24); scutum micropunctate and somewhat roughened; scutellum finely rugose. Dark, almost black species from spiny spring galls on midrib of undersurface of leaves of *Q. gambelii*, *Q. toumeyi*, and *Q. undulata* Torr. in Arizona ..... *A. acraspiformis* Weld
- 8'. Head deltoid in frontal view (almost as high as wide) (Fig. 25); scutum smooth, shining; scutellum microscopically coriaceous. Brown species from globular (3 mm diameter), thin-walled galls on undersurfaces of leaves of *Q. turbinella* in Arizona.....  
..... *A. magdalenae* Weld
- 9(7'). Arcuate foveal furrow, at base of scutellum, narrow, shining and almost smooth at bottom; scutellum margined, ridges extending onto sides of disc. Red-brown species from, distinctive, spiny, club-shaped leaf galls on *Q. dumosa* Nutt. and *Q. lobata* Née in California ..... *A. douglasii* (Ashmead)
- 9'. Foveal furrow broad, ridged on bottom; scutellum margined on sides, but ridges not extending onto disc. Darkly infuscated species from spiny leaf galls resembling miniature “sea urchins” on *Q. douglasii* Hook. & Arn. in California ..... *A. echinus* (Ashmead)
- 10(4'). Antenna 15-segmented; wings hyaline, clear; scutum smooth, shining. Amber yellow species from terminal, cap-shaped bud galls on *Q. turbinella* in New Mexico ..... *A. pileus* Weld
- 10'. Antenna 14-segmented; wings with dark patches in Cubital Cell; scutum coriaceous ..... 11
- 11(10'). Disc of scutellum longer than broad and coarsely rugose; Rs<sub>2</sub> of forewing only slightly enlarged at wing margin; outline of head deltoid in frontal view (Fig. 25). Dark species from globular bud galls on *Q. dumosa* and *Q. douglasii* in California (possible bisexual generation of *A. echinus*) ..... *A. ribes* (Kinsey)
- 11'. Disc of scutellum as broad as long and finely rugose; Rs<sub>2</sub> forming a distinct club at wing margin; outline of head, oval in frontal view (Fig. 25). Light brown species from thin-walled bud galls on *Q. douglasii* and *Q. lobata* in California (possible bisexual generation of *A. douglasii*) ..... *A. lobata* (McCracken & Egbert)

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